been found. The fires could not have been those of charcoal pits, nor was it a lime-kiln. There must have been an immense amount of fuel collected to burn this mass of clay and stone." The theory of cremation was discussed, but if these are crematories it is quite remarkable that no bones or remnants are found.

MICROSCOPY.[1]

Demonstration of the Chromosomes.[2]—In the preparation of the egg for tracing the history of the nuclear elements, Boveri employed two methods. In one, the preservative fluid was a mixture of picric and acetic acid, and the staining fluid borax-carmine; in the other, which was the principal reliance, Schneider's acid-carmine served both as a preservative and staining medium. The living egg is followed under the microscope until the desired stage is reached; then a drop of acid-carmine is added at one side of the cover-glass, and drawn under by the aid of a bit of filter-paper applied at the opposite side. After 5-30 minutes the fluid is replaced by glacial acetic acid, which decolorizes all parts of the egg except the chromosomes, and at the same time renders the cytoplasm quite clear, while giving a sharp definition to the chromatic elements. The achromatic elements are not well preserved.

The egg so prepared is mounted in glycerine. In order to determine the exact number of chromosomes it was often found necessary to press the egg more or less, and thus separate the chromosomes a little. These preparations last for only a few days.

Caryokinetic Figures.[3]—Dr. Solger calls attention to the fact that the amnion of the rat is more convenient material for exhibiting the caryokinetic figures than the mesentery of the young rabbit (recommended by Orth in his "Cursus der Normalen Histologie"). The advantage of such material is that it can be prepared without the necessity of imbedding and cutting.

The freshly-excised uterus horn is placed in *a saturated aqueous solution of picrid acid*, and then the egg-membranes—at least the chorion—is cut open with scissors. The amnion (of embryos 1.8 cm. long to 2 cm. long) then floats as a very thin membrane, or as a closed sac still envelops the embryo.

[1] Edited by C. O. Whitman, Clark University, Worcester, Mass.

[2] Boveri. Jen. Zeitschr. XXIV., 2 and 3, 1890, p. 319.

[3] B. Solger. Arch. f. mik. Anat., XXXIII., 4, p. 517, 1889.

After 24 hours the preparation is washed and placed in 70 per cent. alcohol, which is then gradually replaced by a higher grade. For staining, Ehrlich's acid hæmatoxylin, diluted with half its volume of water, is used for five minutes.

Flemming's fluid, followed by saffranin, also gives excellent preparations.

Direct Division of the Nucleus.[4]—Platner avows his conviction that the nucleus does divide, in some cases at least, without any caryokinetic phenomena. This fact, according to Platner, is clearly shown in *malpighian tubes* of insects (e.g., Dytiscus). The gland-cells are very large, and their nuclei are often three or more times the diameter of the nuclei in Triton cells. The tubular organs can be examined in toto without the trouble of imbedding and cutting.

Kleinenberg's picro-sulphuric acid is recommended for hardening, and borax-carmine for staining.

Spermatogenesis in the Hermaphrodite Gland of Limax agrestis.[5]—Platner recommends the following method of preparation for the reproductive elements in Limax:

The fresh hermaphrodite gland is placed in the stronger Flemming's fluid for one hour; then three to four times its volume of water is added to the fluid, and the object left 24 hours. The preparation is then washed in the manner described by Flemming, and passed through ascending grades of alcohol.

The following hæmatoxylin solution gives the best stain for the neben-nucleus:

Hæmatoxylin	1 g.
Alcohol absol.	70 g.
Aq. dest.	30 g.

To be kept in a dark bottle.

The object is stained in toto 24 hours; then decolorized in a 1% alcoholic solution of bichromate of potash. For this purpose a solution of 10 parts of bichromate of potash in 300 parts aq. dest. is kept on hand, from which 30 ccm. may be taken each time for use, and mixed with 70 ccm. 95 per cent. alcohol. The fluid should be kept in the dark during the process of decolorizing, which may require from 12 to 24 hours.

The object is next placed in 70 per cent. alcohol, and kept dark for one or more days. Then follows absolute alcohol, cedar oil, and imbedding in paraffine.

[4] Platner. Arch. f. mik. Anat. XXXIII., 1, 1889, p. 145.

[5] Platner. Arch. f. mik. Anat. XXXIII., 1, 1889, p. 126-7.

Conjugation in the Infusoria.[6]—Lack of material has hitherto been the chief difficulty in the way of thorough study of the phenomena of conjugation. Investigators like Balbiani, Stein, and Bütschli have complained of the rarity of this state, and have explained their incomplete and fragmentary observations on this ground. The subject itself is extremely complex, and requires, as a first condition of successful study, most abundant material.

Thanks to Maupas, we now know how to supply this need. Take stagnant water containing algæ, confervæ, debris of dead leaves, and other vegetable matter, and keep it in dishes covered with glass plates, to prevent evaporation and to guard against dust, until putrid fermentation sets in. Infusoria contained in this water, finding abundant nourishment, multiply in great numbers. When they become abundant they may be taken up in a drop of water and kept on slides in damp chambers, as before described.[7] The infusoria continue to multiply until the supply of food fails; *hunger then leads them to conjugate.*

When rare species are desired, which do not multiply rapidly in small aquaria, two individuals from different sources may be isolated, and made to multiply on slides kept in damp chambers. Mixture of specimens from the two slides, when the food-supply is exhausted, usually results in conjugations.

The isolation of groups of infusoria on slides offers still another important advantage: it enables one to examine them easily with the microscope, and thus to catch the first conjugations.

Maupas calls attention to the fact that, as a general rule, conjugation is most frequent towards the end of night and during the early morning hours.

In beginning the study of a new species the first thing to determine is the duration of the period of conjugation. This point ascertained will serve to guide the course of investigation. The isolation of couples in conjugation is indispensable to the study of the phenomena following separation.

For killing isolated couples at successive hours, in order to trace the history of the nuclei, Maupas recommends corrosive sublimate (1 : 100) as the best reagent. He proceeds as follows: The infusoria are taken up with a pipette and placed in a drop of water on a slide. Fine hairs, suited in thickness to the species under study, are then placed on either side of the drop, as supports for the cover-glass. The in-

[6] Maupas. Arch. de Zool. exp. et gén., 1889, No. 2, p. 168.

[7] NATURALIST, April, 1889.

fusoria should be somewhat compressed, but not crushed. The cover-glass is then placed, and the sublimate added as quickly as possible at one side, and sucked under by the aid of a bit of blotting paper at the other side, care being taken not to disturb the cover. After fixation, the preparations are stained with methyl green in two per cent acetic acid, and then mounted in glycerine. In some species it is best to omit staining altogether, as the stain obscures the micronuclear elements.

It is perfectly useless to undertake the study of conjugation without a powerful homogenous immersion objective.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

The American Association for the Advancement of Science, of 1890.—The committee of the A. A. A. S. *on* the International Congress of Geologists has been discharged by a vote of the association at its recent meeting in Indianapolis. It is unnecessary now to inquire into the motives which induced a small number of persons to cause this act to be accomplished by the body of the association which was ignorant of the true facts, or to scrutinize the means employed by the party of destruction; further than to say that neither the president nor secretary, nor (it is believed) the majority of the members of that committee, asked or desired such discharge. In a letter written by Professor Hall, the president, to Dr. Frazer, the secretary, before the meeting, a copy of which was sent to Prof. Stevenson, he says: "I had no personal or ulterior purpose in keeping the committee in existence last year. I believe that several of us considered it better to do so at that time,—and certainly we were not then prepared to say our work is finished, nor are we prepared to say that now. * * * *If the majority of the members agree to it*, I see no objection to *making our final report and asking to be discharged.* I do not think it courteous or becoming in gentlemen of the council of the A. A. A. S. to move the abolition of the committee, and especially men who are not geologists," etc., etc.

Upon learning, after the meeting, that it was reported there that he had authorized his signature to be attached to a paper asking for the discharge of the said committee, Prof. Hall wrote: "I have never signed nor authorized any one to sign for me any paper whatever, except to you [the secretary] and for your report. I sent a copy of my letter to you * * * to Professor Stevenson, and wrote him giving my rea-